



International Nuclear Safety Center



Monthly Report (Period Ending 30 April 1999)

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This report is available on the Internet <http://www.insc.anl.gov>

Current Items:

New Work Orders for RINSC – Joe Braun (ANL) carried three new Work Orders with him when he went to Moscow on 19-23 April to coordinate USINSC and RINSC activities. These Work Orders cover the Phase 3 work by RINSC on the Joint Projects on Coupled Neutronic and Thermal Hydraulic Codes, Severe Accident Management, and Structural Analysis. These Work Orders are under the Basic Ordering Agreement (BOA) with RINSC. These new Work Orders replace all NIKIET people with non-NIKIET people. RINSC signed the Work Order for Structural Analysis. The Work Order for the Phase 3 activities for the Joint Project on Coupled Codes was not signed because RINSC is holding discussions with Dr. Kryushkin, of Kurchatov Institute (KI), to take over the lead role from Dr. Lev Podlazov from NIKIET on this Joint Project. Kryushkin wanted to take a week or so to study the Statement of Work (SOW) before he agreed to lead the effort. Similarly, the Work Order on SAM was not signed because the new Russian Principal Investigator (PI), Nikolai Fil of Gidropress in Podulsk, was away on travel and had not seen the final version of the SOW. There was good discussion and verbal agreement on a fourth Work Order for the Joint Project on Material Properties.

International Center for Environmental Safety (ICES) – Joe Braun met with Albert Vasiliev, Director of ICES, and Sergei Bougaenko, Director of RINSC, on 21 April to discuss various aspects of the ICES. At the meeting the three discussed the ICES startup in light of the Sanctions. Bougaenko agreed to do what he could to help the ICES get started. This includes computer access, email, possibly setting up a web site for the ICES, and possibly contracting for the ICES using the existing ANL/RINSC BOA.

International Science and Technology Center (ISTC) – On 21 April Alex Kraev (RINSC) and Joe Braun (USINSC) met with Lev Tocheny, the Senior Project Manager at the ISTC and Randy Beatty, Deputy Executive Director of the ISTC. Beatty is on assignment from ORNL. The goal was to learn more about the ISTC to see what would be needed to get ISTC funds to help people from the nuclear cities and other places, if possible get involved with the work on the Joint Project activities of the two Centers. There are no restrictions that would prevent the RINSC from applying for such a grant and being the Russian manager of this work. The State Department would need to approve this funding.



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Current Items: (cont'd)

RELAP-3D Implementation at RINSC – RELAP-3D was down loaded from INEEL to RINSC computers in April and test cases have been run on the RINSC computer. The effort was not as simple as expected because the RINSC SGI Origin 200 is sufficiently different from the Workstations at INEEL that it was necessary to reconfigure the software. Remote access from ANL is now being tested. RINSC will contact the people in Ukraine to see if they have the right equipment for remote access. They will need a PC, XWindows Client, and a reasonably fast Internet connection (minimum 64 kb/s).

Phase 3 Plans for Database Development – On 19 and 22 April Joe Braun met with Ilya Denisov and Sasha Dudkin of RINSC to negotiate the next phase of this Joint Project. Between the two meetings Denisov and Dudkin had a video conference with Hubert Ley (ANL) on this topic. The following tasks were discussed:

- Plan Red Book for VVERs
- Procure ORACLE and DEC Unix support for ORACLE Version 8I (I=Internet)
- ORACLE Web Application Server Implementation
- Link ORACLE directly to the Web page.
- ORACLE Database link between RF and US INSCs.
- Procurement of four “basic” PCS to support computer training at RINSC.

Follow-up Actions with NEA Resulting from Review of MINATOM Plan. – Gianni Frescura of the NEA has suggested six or seven small projects as a follow-up to the NEA review of the MINATOM Plan. These were discussed with DOE in March. The least costly, and yet beneficial, of these appear to be development of a Fire Protection Database (NRC has offered its database at no cost), and NEA participation in the October '99 SAM Meeting in Obninsk. These are being pursued.

Strategic Actions for USINSC and RINSC – In preparation for the next Semi-Annual Meeting of the two Centers, which might also include the Kazakstan Center, a number of documents will be prepared for release to help improve the visibility of the two Centers. The big immediate items are:

- Issue Joint R&D Plan, recently signed by Adamov and Richardson,
- Complete and distribute the MINATOM Research Plan. NEA has already distributed a glossy covered version of its Review of the Second Draft of the Plan. A Russian Language version of the Third Draft has been received as a deliverable. The translation into English will take 6-8 weeks.
- Distribute individual Plans of the two Centers.
- Follow-up on earlier contacts with GRS, IPSN, DOE, and NEA including the list of items suggested by G. Frescura.



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Current Items: (cont'd)

Slovak Training Activity at ANL – On 1 March 1999 Dr. Martin Kristof of the Nuclear Regulatory Authority of the Slovak Republic (UJD) began a six month training activity at ANL. He is sponsored by the IAEA/USNRC Nuclear Safety Fellowship Program for this activity. Dr. Kristof is working to improve and complete MELCOR input decks for the Bohunice VVER-440 Model V230 and VVER-440 Model V213 nuclear power plants that have been partially developed at UJD. He will also compare MELCOR with available data for thermal hydraulic transients from Slovakian plants, Slovakian results for accident sequences calculated with more detailed thermal hydraulic codes such as RELAP5 and with available results for accidents calculated in Slovakia with SCDAP/RELAP5 and MAAP4-VVER.

Lithuanian Training Activity at ANL – On 29 March Professor Arvyda Adomavicius and Valdas Ledzinskas completed a six month training activity on MELCOR at ANL. Their project was to develop a MELCOR model of the Ignalina RBMK-1500. They completed a report that includes a documentation of the reactor coolant system and core input models that they developed. Selected results of the early phase of several accident sequences are included in the report. These two scientists were sponsored by the IAEA/USNRC Nuclear Safety Fellowship Program.

Paper to be Presented on Joint Work on Coupled Codes – A paper based on the assessment of the VNIIEF KORAT-3D parallel code performance on the ANL IBM SP computer has been jointly written by RINSC and USINSC participants has been accepted for publication in the American Nuclear Society *Transactions* of the National Meeting to be held in Boston in June 1999. The work contained in the paper was done during the INSC Technical Exchange Program in September 1998.

Invited Paper on Coupled Codes to be Presented at International Meeting – An invited paper titled *OECD/NEA PWR MSLB Benchmark Sensitivity Studies using SAS-DIF3DK* has been submitted to the International Conference on Mathematics and Computation to be held in Madrid in September 1999. The sensitivity studies that are discussed in the paper show the high level of detail that is achievable with SAS-DIF3DK in the models of transients that exhibit pronounced spatial effects and coupled phenomena. Additionally, neutron kinetics solution approximations are evaluated and it is suggested that point kinetics solutions should be used with caution and that a reactor- and transient-specific comparison to a detailed space-time solution is often needed to ensure that the point kinetics solution is truly conservative.



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Current Items: (cont'd)

Paper on Code Validation to be Presented at a National Meeting – A paper entitled *RELAP5 Code Validation Methodology Applied to the RBMK and VVER Reactor Designs* has been accepted for presentation at the Second International Symposium on Validation of Systems Transients Analysis Codes, part of the Third ASME/JSME Joint Fluids Engineering Conference in San Francisco (July 18-23, 1999). The paper was prepared jointly by the U.S. organizations participating in the project (ANL, PNNL, INEEL) and the main Russian participants in the project (from EREC, Gidropress, RRC-KI, and NIKIET). The conference organizers have suggested that the paper be published in a journal.

Meeting on Inter-Granular Stress Corrosion Cracking (IGSCC) in RBMKs – Tom Moran (ANL) and Tom Taylor (PNNL) participated in the IAEA Experts Group on Safety Assessment in Vienna on 12-16 April. This group will serve as a steering committee for a program on IGSCC in RBMKs. The group defined a four-part program, based on earlier experts meetings, that includes:

- Improvements in In-service Inspection and Qualification
- Comprehensive Assessment Techniques
- Qualification of Repair Techniques
- Decontamination Techniques

If this program is adopted by the IAEA and funding is identified, it will provide the technical basis for plant-specific plans to safely manage IGSCC in RBMK reactors and be a basis for training plant personnel in the appropriate inspection and repair techniques. The program does not contain assistance in the preparation of specific safety assessments for IGSCC management plans. Providing mentoring and peer review in the development of these safety assessments might be an appropriate tasks for the INSCs.

Activities Calendar:

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| 10-15 May | <u>Severe Accident Management</u> - Bruce Spencer to will be in Moscow to plan continuation of the Joint Project on Severe Accident Management Studies. |
| Week of July 26 | <u>International RELAP Users Group (IRUG) Meeting</u> - Russian users of RELAP-3D will attend the next meeting of IRUG in Park City, Utah. A follow-up meeting is tentatively scheduled to occur in Obninsk, Russia in October as an adjunct to the INSP Analysis Forum. |



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- July-August *Semi-Annual Meeting of USINSC/RINSC* - The meeting will be timed to allow Russian visitors to attend IRUG (above).
- 18-23 July 1999 *Paper on Code Validation to be Presented at a National Meeting* - A paper entitled *RELAP5 Code Validation Methodology Applied to the RBMK and VVER Reactor Designs* will be presented at the Second International Symposium on Validation of Systems Transients Analysis Codes, part of the Third ASME/JSME Joint Fluids Engineering Conference in San Francisco (July 18-23, 1999). The paper was prepared jointly by the U.S. organizations participating in the Joint Project on Code Validation and Verification (ANL, PNNL, INEEL) and the main Russian participants in the project (from EREC, Gidropress, RRC-KI, and NIKIET).
- September 1999 *Invited Paper on Coupled Codes to be Presented at International Meeting* - An invited paper titled *OECD/NEA PWR MSLB Benchmark Sensitivity Studies using SAS-DIF3DK* will be presented at the International Conference on Mathematics and Computation to be held in Madrid in September 1999. The paper shows the high level of detail that is achievable with SAS-DIF3DK in the modeling of transients that exhibit pronounced spatial effects and coupled phenomena.